

Middle Pleistocene Fan 1 (MPL F1) Play

Angulogerina "B" biozone

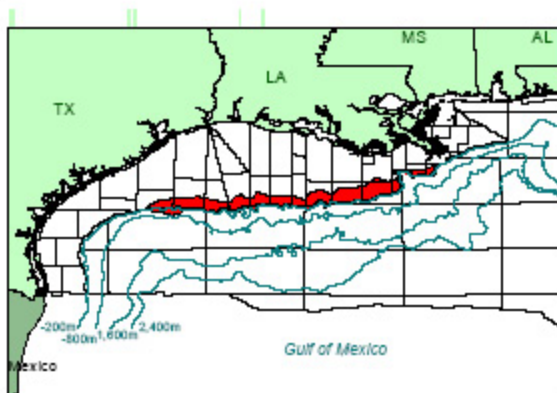


Figure 1. Play location.

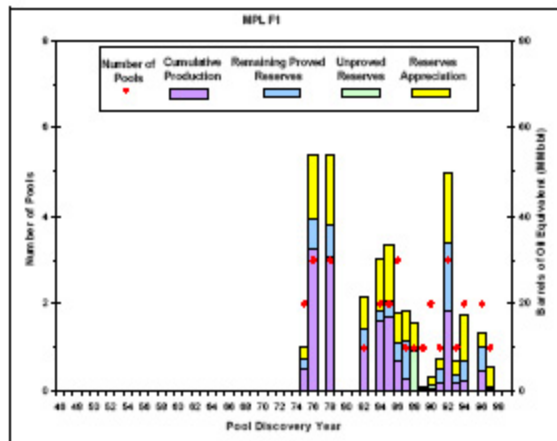


Figure 2. Exploration history graph showing reserves addition and number of pool discoveries by year.

| MPL F1 Play | | Minimum | Mean | Maximum |
|--------------------------|----------|---------|------|---------|
| 31 Pools | 83 Sands | | | |
| Water depth (feet) | | 165 | 384 | 958 |
| Subsea depth (feet) | | 4918 | 8399 | 13001 |
| Number of sands per pool | | 1 | 3 | 9 |
| Porosity | | 25% | 30% | 35% |
| Water saturation | | 16% | 30% | 48% |

Table 1. Pool attributes. Values are volume-weighted averages of individual reservoir attributes.

Play Description

The established Middle Pleistocene Fan (MPL F1) play occurs at the *Angulogerina* "B" biozone. The play is also defined by deep-sea fan sediments in an extensional structural regime of salt-withdrawal basins and listric faulting located on the modern Gulf of Mexico Region shelf. The MPL F1 play extends in a narrow band from the Galveston/East Breaks Areas offshore Texas to the South Pass/Mississippi Canyon Areas near the present-day Mississippi River Delta (figure 1).

The play is bounded updip and to the northeast by the shelf/slope break associated with the *Angulogerina* "B" biozone and sediments of the Middle Pleistocene Progradational (MPL P1) play. To the west, the play is bounded by a lack of sediment influx at the edge of the MPL depocenter. Down-dip, the MPL F1 play is limited by the structural boundary of the Middle Pleistocene Fan 2 (MPL F2) play.

Play Characteristics

The MPL F1 play is characterized by deepwater turbidites deposited basinward of the MPL shelf margin on the MPL upper and lower slope, in topographically low areas between salt structure highs, and on the abyssal plain. Component depositional facies include channel/levee complexes, sheet-sand lobes, interlobes, lobe fringes, and slumps. These deep-sea fan facies are often overlain by thick shale intervals representative of zones of sand bypass on the shelf, or sand-poor zones on the slope.

Over one-third of the fields in the MPL F1 play are structurally associated with salt diapirs with hydrocarbons trapped on diapir flanks or in sediments draped over diapir tops. Less common trapping

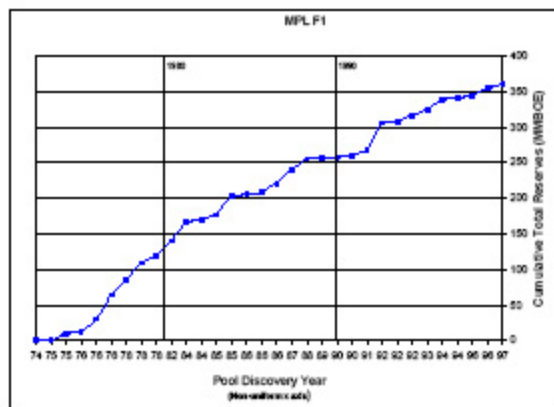


Figure 3. Plot of pools showing cumulative reserves by discovery order. Note the non-uniform x axis.

| MPL F1 Play Marginal Probability = 1.00 | Number of Pools | Oil (Bbbl) | Gas (Tcf) | BOE (Bbbl) |
|--|--------------------|---------------|--------------|---------------|
| Reserves | | | | |
| Original proved | 29 | 0.071 | 0.866 | 0.223 |
| Cumulative production | — | 0.054 | 0.561 | 0.153 |
| Remaining proved | — | 0.017 | 0.295 | 0.070 |
| Unproved | 2 | 0.008 | 0.016 | 0.010 |
| Appreciation (P & U) | — | 0.042 | 0.476 | 0.127 |
| Undiscovered Conventionally Recoverable Resources | | | | |
| 95th percentile | — | 0.026 | 0.563 | 0.134 |
| Mean | 22 | 0.046 | 0.849 | 0.197 |
| 5th percentile | — | 0.076 | 1.346 | 0.296 |
| Total Endowment | | | | |
| 95th percentile | — | 0.146 | 1.911 | 0.494 |
| Mean | 53 | 0.166 | 2.197 | 0.557 |
| 5th percentile | — | 0.196 | 2.694 | 0.656 |

Table 2. Assessment results for reserves, undiscovered conventionally recoverable resources, and total endowment.

structures in the play are growth fault anticlines and normal faults. In addition, a few fields contain hydrocarbon accumulations trapped by permeability barriers and updip pinchouts or facies changes. Seals are provided by the juxtaposition of reservoir sands with shales and salt, either structurally (e.g., faulting, diapirism) or stratigraphically (e.g., lateral shale-outs, overlying shales).

Discoveries

The MPL F1 mixed oil and gas play contains total reserves of 0.120 Bbo and 1.348 Tcfg (0.360 BBOE), of which 0.054 Bbo and 0.561 Tcfg (0.153 BBOE) have been produced. The play contains 83 producible sands in 31 pools of which 29 contain proved reserves (table 1; refer to the Methodology section for a discussion of reservoirs, sands, and pools). The first reserves in the play were discovered in 1975 in the Eugene Island 342 field (figure 2). Maximum yearly total reserves of 54 MMBOE were added in 1976 with the discovery of three pools. The largest discovered pool in the play was found in 1992 in the East Cameron 338 field with 39 MMBOE in total reserves (figures 2 and 3). Eighty percent of the play's cumulative production and seventy-one percent of the play's total reserves are from pools discovered before 1990. The most recent discovery prior to this study's cutoff date of January 1, 1999, was in 1997.

The 31 discovered pools contain 127 reservoirs, of which 65 are nonassociated gas, 40 are undersaturated oil, and 22 are saturated oil. Cumulative production has consisted of 65 percent gas and 35 percent oil.

Assessment Results

The marginal probability of hydrocarbons for the MPL F1 play is 1.00. The play contains a mean total endowment of 0.166 Bbo and 2.197 Tcfg (0.557 BBOE) (table 2). Twenty-seven percent of this BOE mean total

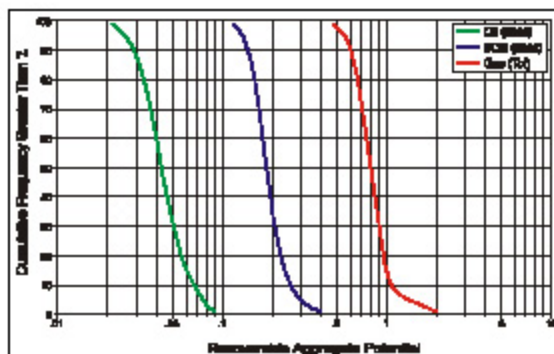


Figure 4. Cumulative probability distribution for undiscovered conventionally recoverable resources.

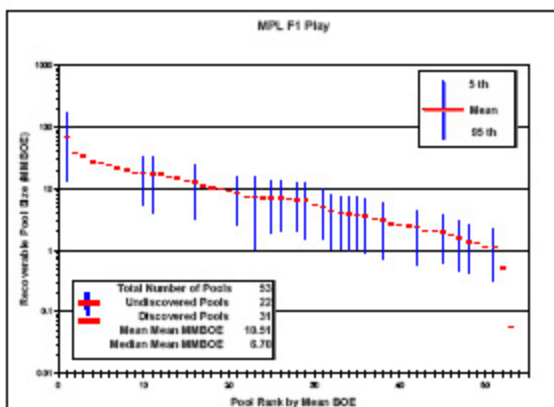


Figure 5. Pool rank plot showing the number of discovered pools (red lines) and the number of pools forecast as remaining to be discovered (blue bars).

endowment has been produced.

Assessment results indicate that undiscovered conventionally recoverable resources (UCRR) have a range of 0.026 to 0.076 Bbo and 0.583 to 1.346 Tcrg at the 95th and 5th percentiles, respectively (figure 4). The mean UCRR are estimated at 0.046 Bbo and 0.849 Tcrg (0.197 BBOE). These undiscovered resources might occur in as many as 22 pools. The largest undiscovered pool, with a mean size of 69 MMBOE, is also forecast to be the largest pool in the play (figure 5). The forecast places the next four largest undiscovered pools in positions 10, 11, 16, and 21 on the pool rank plot. For all the undiscovered pools in the MPL F1 play, the mean mean size is 9 MMBOE, which is smaller than the 12 MMBOE mean size of the discovered pools. The mean mean size for all pools, including both discovered and undiscovered, is 11 MMBOE.

The MPL F1 is a relatively well-explored fan play. BOE mean UCRR contribute 35 percent to the play's BOE mean total endowment. Future discoveries will continue to be made around salt structures in structural and stratigraphic traps. Of note is that the largest pool in the play is forecast yet to be discovered.